ON THE

EXPLORATION

OF THE

NORTH POLAR REGION.

BY

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ARCTIC discovery, however imperfectly treated, must always, I feel sure, claim the attention of all true lovers of geography and physical science, especially that of a Society which, in its present prosperity, represents the deep interest recently exhibited by all grades of the public in the solution of the problem of a communication between the Pacific and Atlantic, and of the world-wide sympathy in the noble devotion by which that mystery was solved.

I need not, therefore, offer an apology to the members of the Royal Geographical Society for any effort upon my part to show the perfect practicability of an exploration of the blank space around our Northern Pole, and to place before you opinions entertained by myself, and those of my brother Arctic explorers who do *not* belong to the new school of "rest and be thankful" men, either in science or naval achievement, and who are no more prepared to turn their backs upon the Arctic Regions because Franklin died off King William's Land, than you would wish them to do so to an enemy's fleet, because Nelson fell at Trafalgar.

In the year 1818, Baffin's discoveries upon the one hand, and those of Behring upon the other, with dots for the mouths of the Mackenzie and Hearn rivers, was all we knew of the strange labyrinth of lands and waters now accurately delineated upon our charts of the Arctic Zone. Sailors and travellers, in thirty-six

years, have accomplished all this: not always, be it remembered, in well-stored ships, sailing rapidly from point to point, but for the most part by patiently toiling on foot, or coasting in open boats round every bay and fiord. Sir Leopold McClintock tells the Royal Dublin Society that he estimates the foot explorations accomplished in the search for Franklin alone at about 40,000 miles. Yet during those thirty-six years of glorious enterprise by ship, by boat, and by sledge, England only fairly lost one expedition, and 128 souls, out of forty-two successive expeditions, and has never lost a sledge-party out of about one hundred that have toiled within the Arctic Circle. Show me upon the globe's surface an equal amount of geographical discovery, or in history as arduous an achievement, with a smaller amount of human sacrifice, and then I will concede that Arctic exploration has entailed more than its due proportion of suffering.

They who assert that our labours and researches have merely added so many miles of unprofitable coast-line to our charts, had better compare our knowledge of Arctic phenomena to-day with the theories enunciated by men of learning and repute a century ago. They should confront our knowledge of 1864 with that of 1800 upon the natural history, meteorology, climate, and winds of the Arctic Regions. They must remember that it was there we obtained the clue, still unravelled, of the laws of those mysterious currents which flow through the wastes of the ocean like two mighty rivers—the Gulf Stream, and the Ice Stream; they must remember that it was there—in Boothia—that the two Rosses first reached the Magnetic Pole, that mysterious point round which revolves the mariner's compass over one half of the Northern hemisphere; and let the world say whether the mass of observations collected by our explorers on all sides of that Magnetic Pole have added nothing to the knowledge of the laws of magnetic declination and dip. They should remember how, a few years ago, it was gravely debated whether man could exist through the rigours and darkness of a Polar winter, and how we have only recently discovered that Providence has peopled that region to the extreme latitude yet reached, and that the animals upon which they subsist are there likewise, in winter as well as in summer. All this, and much more, should be borne in mind by those cynics who would have you believe we have toiled in vain; and I hold, with the late Admiral Beechey, "that every voyage to the North has tended to remove that veil of obscurity which previously hung over the geography and all the phenomena of the Arctic Regions. Before those voyages all was darkness and terror, all beyond the North Cape a blank; but, since then, each successive voyage has swept away some gloomy superstition, has brought to light some

new phenomenon, and tended to the advancement of human knowledge."

I will not dwell upon the personal hardships or risks incurred—they can be easily discounted at any Insurance Company in the City of London, and the privations are best appreciated by those who have been sledging over the barren grounds of 76° N., and are not scared by the recollection of cold fingers and banian days. Men do not volunteer for certain death or starvation, and I can only say that so popular is Arctic service with our sailors, that I am frequently asked by old shipmates, "Are we going up that way again, sir? Please don't forget I am a volunteer!" The fact is, more sailors have been thrown to the sharks from the diseases incident to service in China and the coast of Africa, within the last four years, than ever fell in thirty years of Arctic service, and our seamen and officers know it. And, after all, the dangers of exploration in the north are those common to like undertakings in all unknown regions—Speke and Grant seeking for the sources of the Nile, Burton at Harar, Freemont in the Sierra Nevada, Livingstone on the Zambesi, or Burke and Wills in the hungry wilds of Central Australia, have all moments of as great peril as Kane ever endured in Smith Sound, or McClure passed through in Banks's Land.

I will, therefore, without further preamble, deal with the points which are the most important for our consideration.

First. The direction from which a Polar exploration should be undertaken with the least risk and greatest probability of success.

Second. The mode in which such an exploration should be executed, and the scientific results likely to accrue.

We have before us a circumpolar chart. Mark the nearest known points to the Pole—the extremes of Spitzbergen and North Greenland. Let us first deal with Spitzbergen. Hakluyt Head is about 600 miles from the Pole: in the last century the whale fishery was situated off that Cape, and we have the concurrent testimony of all those ancient fishermen to prove that the sea was often found clear of ice for another hundred miles further north. I say, therefore, that sailing-ships have been in that direction within 500 miles of the Pole. For the information of those more sanguine than myself of the existence of open water at the Pole through the action of the Gulf Stream, I annex a table collated, by my kind friend Mr. Markham,* from the data furnished to the Royal Society by the Hon. Daines Barrington, Colonel Beaufoy and others. You will there find that stout old Dutch and English skippers vowed they had been as far north as the 88°, some to

* See p. 17.

83° N., and many into the 82° parallel: indeed one old sailor declared to Master Moxon, hydrographer to Charles II. of glorious memory, that "he had sailed two degrees beyond the Pole!" but it is only fair to add that this was said in dreamy Amsterdam, over strong Dutch beer.

I am content, however, to point to the position reached by the late Sir Edward Parry, in his boat expedition from Spitzbergen in 1827. There, at any rate, he stood upon a floating sea of ice on the night of July 22, 1827, being then in lat. 82° 45′ N., exactly 435 geographical miles from the Pole. He was constrained to give up the attempt simply because the ice was being swept faster to the south than his men could drag their boats to the north. It was the height of the Arctic summer, and all the ice-fields were in motion. The experience of the last twenty years tells us that instead of starting on such a journey in June, Parry ought to have wintered in Spitzbergen, and started for the North in February; and such is the perfection to which Arctic sledge-equipment is now brought, that the weights would be infinitely less for the men to drag, whilst the provisions would last months instead of weeks.

But there are great objections to any effort to reach the Polar area by sledges from Spitzbergen. You will observe as yet no known lands exist upon its meridian and to the north of the island; consequently no fixed points for depôts of provisions: whereas, in Smith Sound, we have a starting-point 120 miles nearer to the Pole, and there is good ground for believing (as I will show) in a further extension of continents or islands upon the meridian of the American and Greenland continents, which is not the case in Spitzbergen. For instance, the floes which drift down upon Spitzbergen from the north contain in their embrace no icebergs proper. This tells us that no extensive lands lie upon that meridian; for the iceberg is a creation of the land, born of a glacier, and not of the sea: whereas these icebergs abound in Smith Sound; and the glaciers, as Kane advanced northward, appeared to increase rather than diminish in extent, which would not be the case if the land ended abruptly near the Humboldt Glacier, in 80° N. latitude.

Those vast accumulations of snow and fresh-water ice, and their beautiful creations the iceberg, tell us of great lands with lofty mountains and deep valleys retaining the moisture and snow-drift of ages, and promise that continuity of coast-line, and that frozen seaboard, which is only needed to enable our explorers to reach the Pole in safety. Greenland, therefore, and not Spitzbergen, is the direction I advocate. At the same time, do not jump to the conclusion that there is nothing to reward the explorer in the direction of Spitzbergen or Nova Zembla, for there is much yet to

be seen and done there in scientific research. The bugbear of Arctic navigation is being gradually dispelled. 'A Cruise in High Latitudes,' and 'A Season among the Walruses,' encourage us to hope, that where yachtsmen have not hesitated to go for pleasure, and where poor Norwegian fishermen yearly sail in almost open boats for hides, ivory, and the more precious livers of Arctic sharks, which produce, as you know, "pure *cod-liver* oil!" it is possible others will yet wend their way for love of science, and add to our knowledge of the laws of electricity, light, magnetism, temperature, and winds.

From Spitzbergen let us turn to Greenland. In the year 1853 my lamented friend Dr. Kane entered Smith Sound, at the head of Baffin Bay, with his little brig, the *Advance*. At that time I was serving with Capt. Richards, the present Hydrographer of the Navy, in an expedition in Wellington Channel, under Sir Edward Belcher; Kellett and McClintock were in Barrow Straits, McClure had just reached the waters of the Atlantic from the Pacific Ocean, Collinson and Rae were in Victoria Land and Boothia, and Inglefield had just made one of his summer trips to Beechey Island. There could not have been less than four hundred British subjects within the Arctic seas. All our ships had been admirably found, and our crews lived in comparative comfort, for the resources of a nation and a great navy had been placed at our disposal. Dr. Kane's expedition was rather the result of private munificence, and a generous impulse of individuals; and it is only fair to Dr. Kane to say, that never in our times has a navigator entered the ice so indifferently prepared for a Polar winter. With only seventeen followers, two of them mutineers, without a steam-power for his solitary vessel, without proper sledge-equipment, without any preserved fresh meat, and a great insufficiency of preserved vegetables, and with only coals enough to serve for twelve months' fuel, the only marvel to me is, that he ever returned to relate his sufferings. They are only to be equalled by those of the navigator "James," in Hudson Bay, two centuries earlier. God forbid that I should be thought to cast one reflection upon those warm-hearted Americans who came nobly forward, and said, "We too will aid in Arctic enterprise;" but the fact is, that enthusiasm and high courage without proper knowledge and equipment must, on such service, infallibly lead to the suffering which Dr. Kane's followers endured; and it is *that* which best explains how it was, that whilst our sailors, far beyond the present haunts of Esquimaux, waxed fat and fastidious, Kane's poor followers had to eat the raw flesh of animals to avert the ravages of scurvy brought on by a poisonous dietary of salt-meat. This much to meet the objections of those who point to Dr. Kane's

thrilling narrative with a view to frighten us from Arctic exploration; and I may add, that I know well that chivalrous man never penned those touching episodes to frighten men from high enterprise, but rather to caution us to avoid his mistakes, and to show us how nobly the worst evils may be borne when the cause is a good one.

The brig *Advance* entered Smith Sound, but departed from an Arctic canon by keeping upon the eastern or lee-shore instead of the western or weather shore; she was quickly beset, and fell into a bay 60 miles further on, out of which she never again sailed.

In the spring of 1854 a further exploration was accomplished, of about 160 miles of the Greenland coast, and the western land was observed for a still greater distance. The extreme of Greenland visited was a point beyond a stupendous tongue of the great glacier, and named Cape Constitution by the only man (Mr. Morton) who reached it. This sailor could not get round the Cape because of water existing at the base of the cliffs; he could not scale the cliff, because it was too steep; what more there is, therefore, beyond Cape Constitution, none of us know. Kane thought it the termination of Greenland. I entirely dissent from so hasty a conclusion, because I cannot believe that such a glacier as that of Humboldt, ever bearing the hundreds of icebergs, which Kane tells us of, into the waters of Smith Sound, was fed otherwise than by some extensive parent-glacier spread over a very great area; and this proclaims, in my opinion, a continuity of the Greenland shore, as there was, undoubtedly, land on the opposite side as far as Morton could see.

Scrambling up the face of Cape Constitution, to the height of either 300 or 500 feet, Mr. Morton could see no ice to the westward; to which I attach small importance, never having myself seen floe-ice from any altitude at a greater distance than 12 miles; but he did see land rolling away to the northward, a bold but indented coast, he thinks, with a fine range of mountains looming in the interior. This land is appropriately named Grinnell Land.

English and American hydrographers are at variance as to the assigned latitudes of Cape Constitution and Cape Parry, the two extremes discovered by Kane. I sincerely trust the American computation will prove correct. Cape Constitution will then be in 81° 22′ N., and the point seen on the west land would be in about 82° 30′ N., or just 450 miles from our Pole, a distance equal to that of the Land's End from Balmoral.

But in order that we may deal with the subject from its worst point of view, I am prepared to accept the more southern positions assigned to the extremes by Admiral Collinson, Captain George,

and Mr. Arrowsmith. They, as you will observe, place Cape Constitution in lat. 80° 56′ N., and credit Morton's vision with a range of 60 miles; fixing Cape Parry in lat. 81° 56′ only, or a distance of 484 miles from the Pole. I accept this as the distance we have to deal with, and declare that Cape and Grinnell Land as my assurance of the perfect possibility of reaching the Pole.

Cape Parry is, as you see, a fixed point more than a degree and a half nearer to the Pole than Hakluyt Head, in Spitzbergen, and therefore the best point of departure for the exploration of the great unknown space before us.

The distance of Cape Parry to the Pole and back is just 968 miles; a distance which has been repeatedly exceeded by our Arctic sledge and boat parties since the year 1850, and far short of what we subsequently accomplished, as I will presently show.

But, apart from mere proximity to the Pole, there are other conditions which recommend this route to our consideration. It will be remembered that at Cape Constitution a considerable extent of water was found to exist in the early summer. Recent Arctic explorations have taught us that this is no great novelty. Dr. Kane, however, believes it to be very extensive; but, as I have good reasons for being sceptical upon this point, and as the Pole is within our reach whether Kane's Polynia be great or small, I shall not urge the facilities which open water offers to a boat-navigation. The future explorer might hail open water if it were found to exist along the shores of Grinnell Land; but, if not, he would be well satisfied with plenty of ice, and merely pray that the mainland or off-lying islands should be found to exist as far as the 87th parallel. And there is, I hold, more chance—far more chance—of that being the case, than of any open sea round our Arctic Pole.

But Kane's Polynia evidently exists where there is a far greater abundance of animal and vegetable life than we have found to exist round the *waterholes* of Regent's Inlet, Wellington Channel, or Lancaster Sound. The possibility, therefore, of future explorers of Smith Sound being able to vary their dietary with the flesh of deer, bear, seal, or wild-fowl, is an important recommendation to the route in question.

In this meridian, too, we find human life extending to a higher latitude than in any other known direction. A fine tribe of Arctic savages was first discovered by Sir John Ross in lat. 75° 35′ N., long. 65° 32′ W., in his voyage of 1818. Ross christened this isolated section of the great Esquimaux race, "Arctic Highlanders." Through his interpreter, Sackense, he learnt that their tribe dwelt to the northward of the great glacier of Melville Bay;

by it they were entirely cut off from all knowledge of anything in that direction, and when Ross told them that his ship had come from the south, they replied—"It was not true; there was nothing but ice there!" Subsequent Arctic expeditions, as well as whale-ships, have had intercourse with these people and so far conciliated them, that instead of offering to kill Europeans, as they threatened in 1818, we find them in 1854 positively saving Kane and his followers from starvation, and cheerfully sharing food and lodgement with the poor sailors. Of this isolated group of the human family Dr. Kane gives us a very interesting account. Having no boats, nor a knowledge of how to construct them out of bones and seal-skins, as other Esquimaux do, afraid to cross the two great ice-streams of Melville and of Humboldt, these poor creatures inhabit a region between the prongs of the Greenland Glacier, which embraces about 600 miles of coast-line, and they cannot penetrate far into the interior, for there, they said, was the "Sernik Soak," or Great Ice Wall!

Without any drift-wood, except a fragment of wreck at rare intervals, the Arctic Highlander is compelled to use bones alone in the construction of his sledge and weapons. The latter consist simply of knife, harpoon, and lance, bones lashed together with an iron point or edge ingeniously fitted from fragments of meteoric iron found in the country, or from scraps of iron hoops which reach the coast upon the casks of wrecked whalers. Without a bow or arrow, they are unable to kill reindeer or musk-oxen; the former range unmolested over the barren uplands at the base of the glaciers; and the art of fishing is likewise unknown, for Kane saw lakes full of salmon-trout, which the Arctic Highlander could not catch. With his spear and harpoon, however, he slays the bear, seal, and powerful walrus; and in summer time nets vast quantities of the little auk, a delicious morsel well appreciated by all of us who have visited those Crimson Cliffs of Beverley, as Ross poetically named their haunts. These people are thus dependent for subsistence upon the flesh of marine creatures, and consequently upon the existence of broken ice, or open water near the coast, throughout every season of the year. Without it they would all perish in a single winter. But a Beneficent Providence has so arranged it that from the action of oceanic currents, and the destruction of the ice-fields by the large icebergs thrown off from the glaciers constantly sailing through them, there is always, even in the depth of a Polar winter, some "North Water" to be found, and in it walrus and bear. The land, as I have said, yields these Arctic fishermen no animal food, neither can I discover an instance of their ever having been seen to partake of a single herb, grass, or berry grown upon the shore; of vegetables or cereals they have,

of course, no conception, and I know of no other people on the earth's surface who are thus entirely carnivorous. Kane says they must be an expiring race. I can find no proof of it, though no doubt, like all savage races, they are doomed to pass away or merge into those of a superior organisation. Where Ross found the Arctic Highlanders in 1818, they exist in 1864, and from occasional contact with Europeans have rather improved than deteriorated. All who have seen them, and I am one, describe the men as square-built, hearty fellows, deep-chested, bass-voiced, and merry-hearted. Ready to fasten on with their harpoon to a fierce walrus, and, line in hand, struggle for life with it upon the weak ice; or, aided by their dogs, bring the Polar bear to bay, and close in upon it with lance and knife; yet these poor savages showed in their kindness to the starving and not always rational crew of the *Advance*, that they were not deficient in the nobler attributes of our common nature. Their women, good souls, were tender and sympathetic in their quaint way, for it is not every European mother who would lend a nice warm babe to make a soft pillow for a weary traveller, as the ladies of Etah did; and the spinsters of Smith Sound were fair enough to win the hearts of some on board the *Advance*. Indeed, more than one little scandal related leads me to believe that, in spite of the struggle for existence in 80° N., the unwashed, sealskin-clad beauties of Murchison Sound have their little flirtations, as well as their sisters of ampler robes in more southern climes. "One touch of nature makes the whole world kin;" and I know nothing more strange in all Arctic adventure than when Kane was escaping southward, to find his faithful hunter, Hans, voluntarily abandoning him and turning Arctic Highlander all for the love of Shanghu's pretty daughter—she had gently tended him when injured in a walrus-hunt. The elopement of the fond pair upon a bone-sledge, drawn by wild dogs, is perfect as an Arctic love-scene; but, unfortunately, Hans was already a married man. "Alas for Hans!" Dr. Kane pathetically observes. I say, "Alas for Miss Shanghu!"

It has not been without a purpose that I have thus touched upon the habits of the Arctic Highlanders. I have endeavoured to show you that, though carnivorous creatures, they are, after all, much as we are in other respects: it tells you that there, in Smith Sound, inhabitants exist who have helped the European and can do so again; and, above all, their existence is an incontestable proof of an amount of animal life being found in that latitude throughout the year and in all seasons.

Kane says that his Arctic friends would not carry him beyond the Humboldt Glacier, and seemed to have no knowledge of lands to the north. Yet Morton found a fragment of an Esquimaux

sledge on shore between that glacier and Cape Constitution. May it not be that other Esquimaux exist there? and does not the question occur to you, How far does human life extend in Smith Sound? May it not reach much nearer to the Pole than even where Kane found it in 80° N. So far as we know, the Arctic Highlanders are confined to the Greenland shore; and for our purposes of exploration it would be well it were so. They would then be near enough to aid as hunters and sledge-drivers, and not so close as to endanger good order and discipline amongst a crew in hours of trial or suffering.

There is one more reason for preferring this route to any other, viz., that the Danish settlements extend along the coast of Greenland as high as 72° N. Kane in open boats carried off his men in safety to Upernavik, when it became imperative to do so; other navigators could do likewise, if any accident occurred to their ships in Smith Sound. Trusting I have shown the right direction in which the proposed exploration should be attempted, I will now sketch out the mode in which it should be carried out; for the details would be too technical and voluminous to interest all geographers.

An exploration of the Polar area should always be sent under naval auspices and naval discipline. I have no faith in purely private expeditions on such a service as this I advocate. We need all the resources of a naval dockyard, all the especial knowledge collected in various departments—whether in the preparation of vessels, food, raiment, sledges, or equipment—to insure the work being well and safely done. Wooden ships-of-war are now rotting and sinking at their anchors in our arsenals; all the old ladies round our seaports are cooking their tea with heart-of-oak from poor chopped-up gunboats. We don't want three-deckers, but you might have them for the asking; you can be more modest, and ask for something much smaller than wooden line-of-battle-ships. Of course you will not expect the Admiralty to take the initiative in such matters. Columbus would never have reached the new continent; the immortal Cook would never have made his voyages round the world; the illustrious names of Franklin, Ross, and Parry would not have been added to the rolls of fame; if you had waited for past Admiralties to originate scientific research and geographical exploration.

But I have no doubt men of science—men who think the Navy and its officers and sailors exist for nobler purposes than to slay or be slain—will find His Grace the Duke of Somerset just as amenable to reason and healthy pressure as former First Lords have been. The Board, like other Boards, will, as good servants of the public, do whatever the public calls upon them to do; and it is by

the action of public opinion, directed by the men of science in this country, that I hope to see a Polar expedition sent forth in this generation under naval auspices. The Navy needs some action to wake it up from the sloth of routine, and save it from the canker of prolonged peace. Arctic exploration is more wholesome for it, in a moral as well as a sanitary point of view, than any more Ashantee or Japanese wars.

You are not going to educate us, work us up to the point of nautical perfection, awaken hopes and ambition, and then give us oakum to pick, or run us over the mast-head after top-gallant yards, to keep down the spirit which intellectual progress has evoked. The navy of England cries not for mere war to gratify its desire for honourable employment or fame. There are other achievements, it knows well, as glorious as victorious battle; and a wise ruler and a wise people will, I hold, be careful to satisfy a craving which is the life-blood of a profession—indeed, I hold that it ought to be fostered and encouraged.

Upon these grounds, as well as those of scientific results, would it be too much to ask for a fraction of the vast sum yearly sunk in naval expenditure, for two small screw-vessels and 120 officers and men, out of the 50,000 men annually placed at the disposal of the Admiralty?

Let us suppose it granted, and two vessels like the *Pioneer* and *Intrepid* ready by the spring of 1866. They would sail for Baffin Bay, reach Cape York in August, and one vessel would be secured in or about Cape Isabella, leaving only twenty-five persons in charge of her; the other vessel, with ninety-five souls, would be pressed up the Western shore, either as far as Cape Parry or in that direction, taking care not to exceed a distance of 300 miles from her consort. That autumn the southern ship would connect herself by depôts with the northern vessel, and the northern vessel would place out depôts towards the Pole ready for spring operations.

In 1867 and 1868 sledge and boat operations should be directed towards the pole and over the unknown area, and in 1869, either in ships or by boat to Upernavik, our expedition would retire from Smith Sound. They would thus only have two winters and three summers to encounter; a period which experience has taught us healthy men, with proper care, can well spend at a time in those regions.

With respect to the distance to be traversed by sledge, we have ample data to show that it has been exceeded by our sailors and marines in the most sterile land yet visited within the Frigid Zone. For instance, in 1853, Commander McClintock's party did 1220 geographical miles in 105 days; Lieutenant Mecham did 1203 miles; and Captain Richards and I did 1093 miles. Mark, that

all these distances are in excess of the 968 miles between Cape Parry and the Pole. Lieutenant Hamilton did 1150 miles with a dog-sledge and one man. Yet, in subsequent expeditions to those of 1853, still longer marches have been accomplished, and the men suffered still less. In 1854 Mecham marched 1157 miles in only seventy days, a gain of a month in time, equal to a distance of 300 miles more had it been necessary; and in 1859 Captain McClintock actually accomplished 1330 miles and Young 1150, and that distinguished officer Sir Leopold McClintock agrees with me in thinking that it is quite possible with proper management to extend a journey over a distance of 1500 miles, or just 500 miles more than are required to take a sledge from Cape Parry to the Pole and back. Thanks to hard-earned experience, we have learnt in ten years to double the period a sledge-party may support itself away from the ship, and trebled the length of the journeys to be accomplished; yet at the same time reduced the labour of the seamen and the personal risk to its minimum.

I am not vain enough to suppose my unsupported opinion of the practicability and safety of a sledge-exploration of the Polar area would suffice to convince you all; but I can confidently appeal to an officer of far greater experience, Captain Sir Leopold McClintock. He, writing to me in December last, says: "I am glad you are poking up the embers of Arctic discovery. I wish I were now preparing for a trip to the North Pole. I regard it as being within the reach of this generation; for knowledge, as you know, is power in sledge-travelling." Can you doubt the practicability of such an exploration, I say, after such a declaration from an officer who has spent seven winters and ten summers in these seas? I am sure you will not; and that you will say with me, that of all men he is the best fitted to head such an expedition.

3rd Point. We have now to consider the final portion of my argument:—The advantages to be derived from an exploration of the Polar area.

In the first place, you as a scientific body have before you an unknown area of 1,131,000 square miles of the globe's surface a sheer blank. Within that area you are profoundly ignorant whether there be lands or waters; whether, as some say, it is a silent frozen solitude, or an open sea teeming with animal life. So far as you as yet have explored in that direction, you have found the land capable of supporting not only animal, but human life.

Moreover, as connected with physical geography, you have in 80° of North latitude reached the only known spot where Nature yields to man no plant, herb, or grass, which he uses for food or nutriment. Yet, imperfect as the botanical exploration of that spot has been, we learn from the report of the able American

botanist, Mr. Durand, that although Dr. Kane lost the major portion of his collection, the remainder "was yet the richest and most interesting ever brought by Arctic or Polar explorer;" and Kane added no less than *twenty-seven species* of plants to the list recently published by that eminent Arctic naturalist Sir John Richardson, as existing to the north of 73° of latitude. Proving that, at any rate, there was an error of 50 per cent. in the botanical geography of the region under consideration.

To botanists, therefore, as well as geographers, there is everything to be discovered within the Polar area; and not only the botany of the land, but that of the sea, and of the fresh-water lakes and rivers flowing from the glaciers of that ice-bound region. Immediately in connection, too, with the distribution of the animal and vegetable kingdoms of the Polar Basin, we have to solve more than one strange anomaly in the climate that has been noticed upon its margin.

The lowest known winter mean temperature has been recorded by Dr. Kane, in the very region which is so rich in Arctic flora, where the natives can support themselves alone upon the chase of marine creatures, and where the reindeer are so abundant that a traveller subsequent to Kane shot 600 head, and supported his party upon fresh food throughout a long winter.* There, in Rensselaer Harbour, with open water not far to the south, with open water, as he believed, not far to the north, Kane records a winter mean temperature lower than we have found at Melville Island, where at that season we feel sure that there was no open sea nearer than the Mackenzie River, or the entrance of Lancaster Sound. Mr. Schott, the able American meteorologist, puzzled with the anomaly of so low a temperature near the reported open Polar Sea, says that "it points conclusively to either a considerable northern extension of Grinnell Land on the one side and an eastern extent of Washington Land on the other, or to a considerable elevation of the interior on both sides of the channel above its level," and acknowledges that his conclusions are at variance with the supposed existence of an ocean around the Pole free for navigation.

The fact is, that meteorology is quite as much at fault there as elsewhere when it proceeds to theorise upon insufficient data. And, in a scientific point of view, I maintain that nothing could be more deeply interesting than a careful series of meteorological observations within the Polar area. Its climate is, as I have shown, a mystery; and Kane's rough observations require to be verified, as well as those of our searching-expeditions, by sending

* Mr. Cornelius Grinnell informs me of this interesting fact connected with Dr. Hayes' second visit to Smith Sound.

out a scientific expedition, with people well versed and earnest in that science alone.

In geology, and especially in the phenomena of those stupendous glaciers, as well as the great ice-streams of Humboldt and of Melville, there is much to repay the future explorer of Smith Sound. In the presence of men so eminently qualified to point out what is most deserving of scientific investigation under these heads, it would ill become me to do more than advert to the subject. Indeed, I feel I owe an apology to all men of science for even daring to touch upon subjects of which I as a sailor can have only the most fragmentary knowledge. But I am also addressing myself to those who know little of such subjects, and who may be carried away by the cuckoo cry of "Cui bono?" in discussing further geographical exploration. The learned Council of this Society are not likely to say so, I know well, or to ask me to demonstrate the necessity for further scientific research based upon an argument touching whale-oil, whalebone, walrus-hides, seal-blubber, narwhal-ivory, deer-skins, peltry, or Upernavik graphite. I should as soon think of urging the exploration of New Guinea upon the speculation of profits arising from the tails of birds-of-paradise or edible birds'-nests.

No! I put the question before you upon purely scientific grounds; and I ask you—the Geographical Society—if you are not satisfied with the geographical harvest that awaits you there, to turn to the Royal Society and ask the learned Council whether there is anything likely to repay the explorer of the Pole for his labours? I can confidently appeal to its President, General Sabine. He is to-day the senior living officer of those who accompanied Ross and Parry in their early explorations of the Arctic Zone. In Spitzbergen, Melville Island, and East Greenland he collected those valuable data in terrestrial magnetism which have subsequently led to the construction of those beautiful charts exhibiting the declination, inclination, and intensity of the magnetic force over the globe's surface—a wonderful reduction of scientific data to good, useful purposes, which every sailor can appreciate and be grateful for. And does he tell us that there is nothing more to be done in the Arctic Zone? On the contrary, in General Sabine's Address to the Royal Society, on November 30th, 1863, he dwells especially on the pleasure with which he learns that the Swedish Government are about to carry out in Spitzbergen that measurement of an arc of the meridian, the value and importance of which the learned General had urged forty years ago upon the attention of the British public, and which, he says, "I had planned the means of executing, and which I ardently desired to be permitted to carry out personally."

General Sabine's original interesting paper upon the measurement of this arc was addressed to Mr. Gilbert, M.P., Vice-President of the Royal Society in 1826. In it he pointed out the facility offered by Spitzbergen for a measurement of an arc of the meridian extending over nearly 4½ degrees of latitude, stating that the value of this measurement in the latitude of Spitzbergen, towards deducing the proportion of the polar and equatorial diameters by its combination with an arc near the equator, "was most important;" and adding that its value would be "equivalent to an arc in Lapland of six times the extent of the arc measured by the French Academicians."

Now the hope of the Royal Society of this measurement being at last obtained depends upon the scientific energy of the Swedish Government; but it so happens that in the expedition I urge upon your attention there might be every arrangement made for a measurement of four degrees of the meridian upon the shores of Smith Sound. I have told you that one of the ships should be left about Cape Isabella, and the other pushed on to Cape Parry, or that that point is to be considered our main station for a Polar expedition. The intervening space is rather more than four degrees; and during the summer season, whilst the Northern Expedition was absent, there could be no more profitable way of occupying those left in the charge of the ships than in doing such a work as measuring an arc; the ice of the strait, I would submit, affording considerable facilities for such an undertaking; and especial provision in the expedition might be made for such persons as were well qualified to execute it.

As late, too, as November, 1864, we find General Sabine, in his Address to the Royal Society, calling the attention of that scientific body to some recent discoveries which attest the continuation of the tropical Gulf Stream to the shores of Nova Zembla, and to a communication from Professor Forchhammer, of Copenhagen, "a valuable contribution to a great subject—the History of the Sea"—in which, by careful analysis, it is shown that, in the Atlantic Ocean, the saline ingredients in the sea-water decrease with increasing depth. This is found to hold good even to extreme depths; and the existence of a Polar current in the depths of the Atlantic is hence inferred, since it is a well-established fact that the Equatorial seas are richer, and the Polar seas poorer in saline ingredients. Again, by analysis it has been proved that the current flowing down the east coast of Greenland has an Equatorial and not a Polar origin—a mere recurring of the Gulf Stream after rounding Spitzbergen; and the learned President fairly argued—"May it not be possible that the iceless sea teeming with animal life, described by Kane as viewed from

the northern limit of his research, is, as he himself surmised, but an extension of the same Equatorial stream which produces corresponding abnormal effects at every point to which its course has been traced?" and adds, "when physical researches shall be resumed within the circle which surrounds the Pole, this, perhaps, will be one of the earliest problems to receive solution." In a recent letter to me he eloquently and justly adds, "to reach the Pole is the greatest geographical achievement which can be attempted, and I own I should grieve if it should be first accomplished by any other than an Englishman; it will be the crowning enterprise of those Arctic researches in which our country has hitherto had the pre-eminence."

Table of Voyages towards the North Pole.

(Compiled by Clements R. Markham, Esq., Sec. R.G.S.)

Date.	Captain and Ship.	Latitude.	Nature of Observation.	Authority for the Statement.	Remarks.
A.D. 1266	Normans from Gardar in Greenland.	75° 46′ N.	On July 25th, when on mer. in S., the sun was not higher than that when a man lay down across a six-oared boat, stretched out towards the gunwale, the shadow formed by the side of the boat nearest the sun reached his face; but at midnight the sun was as high as when it was in the N.W. (highest) in Gardar.	Letter from a Norman named Haldor, to another named Arnold. — *Antiq. Amer.*, 'R.G.S. Journal,' viii. p. 127.	Angle formed by gunwale and man's face about 33°, lat. 75°. On July 25th, in 13th century, ⊙ decl. + 17° 54′. Inclination of ecliptic + 13° 32′. Gardar is in 60° 55′ N. Height of ⊙ there when in N.W. at summer solstice 3° 46′: equivalent to midnight alt. of ⊙ on July 25th in 75° 46′ N., a little N. of Barrow's Strait.
1607	Henry Hudson.	81° 30′.	Not stated.	Asher's 'Hudson,' p. 16.	"And this I can assure at this present, that between 78° and 82° by this way there is no passage."
1656	Two Dutchmen.	89° 0′ N.	Four journals kept in the two ships, agreeing within 4 minutes.	Captain Wood's 'Voyage,' p. 145. Wood said that a Captain Goulden told his Majesty so in 1676.	.. .. ..
1864	William de Vlamingh.	82° 10′.	Not stated.	Commodore Jansen, 'R.G.S. Proceedings,' April 10, 1865.	N.W. of Nova Zembla.

TABLE OF VOYAGES TOWARDS THE NORTH POLE—*continued.*

Date.	Captain and Ship.	Latitude.	Nature of Observation.	Authority for the Statement.	Remarks.
A.D. 1670	A Dutchman.	2° beyond the Pole.	Not stated.	Moxon, hydrographer to Charles II., was told so by a sailor in a drinking-shop at Amsterdam, where he went to get a glass of beer.—'Harris,' i. p. 616.	.. .. ..
1690	A Dutch ship.	88° 0′ N.	The captain would suffer no journal to be made.	The story was told in 1745 by Dr. Dallie, who said he was on board, to Dr. Campbell, the editor of Harris's 'Voyages.' Dallie was in Roggewein's voyage.	Weather warm, sea free from ice, and rolling like the Bay of Biscay.
1707	Captain Cornelis Gillis, a Dutchman.	Far beyond 81° 0′ N.	Not stated.	Letter from John Walig to Messrs. Staphorst in 1775.	.. .. ..
1720	Captain Johnson or Monson.	88° 0′ N.	Not stated.	Buffon, 'Nat. Hist.' i. p. 25. M. de Buffon was told so by a Dr. Hickman in 1730.	Barrington thinks that Dr. Halley engaged Captain Johnson to take one of his thermometers to the north, and that he reached 88°.—'Barrington,' p. 47.
	Captain Alexander Cluny.	82° 0′ N.	Not stated.	'Barrington,' p. 48.	A map was engraved under Cluny's directions, with his position on it.
1744	The ship *Captain Guy.*	81° 30′ N.	Obs. of captain and mate.	James Hutton, "a hardy old tar," who was on board.—'Barrington,' p. 64.	.. .. ..
1746	Captain Andrew Fisher, Ship *Ann and Elizabeth.*	82° 34′ N.	.. ..	His own statement.	.. .. ..

1746	Captain Andrew Fisher, Ship *Ann and Elizabeth.*	82° 34′ N.	.. ..	His own statement.	.. .. ..
1751	Captain MacCallam.	83° 30′ N.	Obs. both with Davis and Hadley quadrants.	Story of a Mr. Watts (who was aged 17 when on board) told 20 years afterwards, the captain being dead.	Sea open to the north, not a speck of ice for the last 3 degrees.
1752	Captain John Phillips, Ship *Loyal Club.*	81° 0′ N.	Obs.	His own statement.	He said that it was very common to fish in such latitudes.
1754	Captain James Wilson, Ship *Sea Nymph.*	82° 15′ N.	Obs. of Mr. Ware, the mate.	Mr. Ware's statement.	Sea perfectly clear.
1754	Captain Guy, Ship *Unicorn.*	83° N. (June 4). 82° 3′ N. (June 5).	Obs. of ⊙	Statement of a Mr. Adams, who was on board.	Captain Guy's 59th voyage to those seas.
1756	Captain James Montgomery, Ship *Providence.*	83° N.	Obs.	His own statement.	.. .. ..
1760	Captain Humphrey Ford, Ship *Dolphin.*	81° 0′ N.	Not stated.	His own statement.	.. .. ..
1765	Captain Vassili Tchitschagoff.	80° 30′ N.	Obs. of ⊙.	Pallas.	This was an expedition sent by the Russian Government to Spitzbergen.
1766	Captain Robinson, Ship *Reading.*	82° 30′ N.	D. R.: computed by the run back to Hackluyt Head, in 24 hours.	His own account to Mr. Barrington.	Sea open. He thought he could have reached 83°.
1766	Captain Jonathan Wheatley, Ship *Grampus.*	81° 30′ N.	Not stated.	His own account.	Three Dutch captains told him they had been to 89° N.
1768	David Boyd, Brig *Betsy.*	82° 0′ N.	D. R.	His own statement. He was the mate.	Driven up by a gale of wind, beset.
1773	Captain Ralph Dale, Ship *Ann and Elizabeth.*	81° 0′ N.	Not stated.	His own account.	Found much ice.

TABLE OF VOYAGES TOWARDS THE NORTH POLE—*continued.*

Date.	Captain and Ship.	Latitude.	Nature of Observation.	Authority for the Statement.	Remarks.
A.D.	Captain John Greenshaw.	82° 0′ N.	Not stated.	.. .. ..	Nothing but a solid body of ice west of Spitzbergen. He said that "Captain John Cracroft, in the South Sea Company's time, was once so far as 83° N."
1773	Captain Robinson, Ship *St. George.*	81° 16′ N.	Obs. by Hadley's quadrant "very accurate."	.. .. ..	He afterwards pursued a whale for five hours north, so that he thinks he reached 81° 31′ N., long. 8° E. Sea open to E.N.E.
1773	Captain John Clarke, Ship *Sea Horse.*	81° 30′ N.	D. R.	.. .. ..	Open sea to the N., with a heavy swell from N.E.
1773	Captain Bateson, Ship *Whale.*	82° 15′ N.	D. R.	'Bateson's Journal.'	"A very able sea-officer is satisfied with the accuracy of his account.—'Barrington,' p. 74.
1773	Captain Phipps, Captain Lutwidge; H.M.S. *Racehorse*, H.M.S. *Carcass.*	80° 48′ N.	Obs.	'Phipp's Voyage towards the North Pole.'	The expedition was sent out on the suggestion of the Royal Society and Mr. Barrington. It was found impossible to penetrate the ice north of 81°. The ice was a continued, smooth, unbroken plain to the horizon.
1774	Captain John Reed, Ship *Rockingham.*	81° 42′ N.	Not stated.	His own account.	A Dutch captain, named Hans Derrick, told him that he, with five ships in company, had been to 86° N.

1806	Captain Scoresby, Ship *Resolution.*	81° 12′ 42″ N. 81° 30′ N. (5° 10′ from the Pole.)	Obs. ⊙. D. R.	'My Father.' p. 161.	Navigation quite open to E.N.E. for many leagues.
1818	Captain Buchan, Lieutenant Franklin; H.M.S. *Dorothea*, H.M.S. *Trent.*	80° 34′ N.	Obs. ⊙.	'Barrow,' pp. 56-73.	Stopped by the ice.
1823	Captain Clavering, H.M.S. *Griper*; and Captain Sabine.	80° 20′ N.	Obs. ⊙.	'Barrow,' p. 130.	On the east coast of Greenland, in 75° 12′ N., they saw high land due north as far as 76° N. Coast 3000 feet high, with higher mountains inland.
1827	Captain Parry, H.M.S. *Hecla*; Boats *Enterprise* and *Endeavour.*	82° 45′ N. 19° 25′ E.	Obs. ⊙.	'Barrow,' p. 303.	The Commissioners of Longitude, in their memorial to the King, were of opinion that *there was no well authenticated account of any ship having gone further north than* 81°, except Scoresby.

The usual Spitzbergen fishing-ground in the last century appears to have been between 78° and 80° N. The Dutch skippers replied to Mr. Barrington (in 1774), "We can seldom proceed much higher than 80½° N., but almost always to that latitude."

1853 to 1855	Dr. Kane.	80° 40′ N.	? Mer. Alt. of ⊙. according to Morton.	Statement of Morton, the steward, who said he saw land as far as 82° 30′ N., June 21st to 24th.—'R.G.S. Journal,' xxviii. p. 283, *note.*	See Dr. Rink's arguments against Kane's Polar Sea, in the 'R.G.S. Journal,' xxviii. p. 272 *et seq.*
May 18 1861	Dr. Hayes.	81° 35′ N.	Obs.	'The open Polar Sea,' p. 351.	On the west coast of Kennedy Channel.

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